

REMARKS

Claims 18-35 are currently pending in the subject application, and are presently under consideration. Claims 18-29 and 32-35 are rejected. Claims 30 and 31 have been indicated as allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. Claims 18, 20, 23, 24, 28, 30 and 31 have been amended. Claims 36-51 have been added. Claim 29 has been canceled. Favorable reconsideration of the application is requested in view of the amendments and comments herein.

I. Objections to the Specification

The Specification has been objected to for not including headings. There is no requirement under any section of 35 U.S.C. that a patent application contain headings. Applicant's representative respectfully submits that the Specification complies with all legal requirements of 35 U.S.C. Accordingly, withdrawal of this objection is respectfully requested.

II. Rejection of Claim 24 Under 35 U.S.C. §112, Second Paragraph

Claim 24 stands rejected under 35 U.S.C. §112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter of the invention. Claim 24 has been amended to correct formal matters. Applicant's representative respectfully submits that amended claim 24 is no longer rejectable under 35 U.S.C. §112. Accordingly, withdrawal of this rejection is respectfully requested.

III. Rejection of Claims 18-21, 23 and 24 Under 35 U.S.C. §102(b)

Claims 18-21, 23 and 24 stand rejected under 35 U.S.C. §102(b) as being anticipated by Iwahara (Solid States Ionics Vol. 77, April 1995, pages 289-298) ("Iwahara"). Withdrawal of this rejection is respectfully requested for at least the following reasons.

Claim 18 has been amended to recite that a membrane comprises a material prepared with the use of a Zn doped oxide sintering aid. The amendments to claim 18 are supported by at least

page 5, line 23 to page 6, line 6, page 7, lines 15 to 19 and page 15, lines 1 to 2 of the Specification.

On page 3 of the Office Action, the Examiner contends that the features of claim 18 are disclosed by pages 289, 290 and 295 of Iwahara. Applicant's representative respectfully disagrees. Iwahara does not disclose providing a steam feed stream at one side of a porous redox stable substrate, as recited in amended claim 18. Iwahara discloses a cell employed for steam electrolysis for hydrogen production that includes an electrolyte formed from a ceramic tube made of $\text{SrCe0.95Yb0.05O}_3\text{-}\alpha$ having a thickness of between 1 and 1.5mm (See Iwahara, page 296, left col.). Porous platinum or nickel is baked on an inner surface of the tube to function as a cathode and porous palladium is provided on the outer surface of the tube to function as an anode. The porous electrolyte is mounted via glass packing to a ceramic tube, which houses the cell and acts as a conduit for channeling hydrogen and oxygen away from the cell (Figure 12). Iwahara does not disclose any structure or function that provides a proton conducting membrane supported on a porous redox stable substrate, as recited in amended claim 18. Instead, in Iwahara the proton conductive ceramic tube/electrolyte is supported on glass packing and a non-porous ceramic housing and steam feed is supplied directly to the electrode/electrolyte without first passing through a porous substrate upon which the electrolyte is supported (See Iwahara, Page 295, Fig. 12). Thus, Iwahara does not disclose the providing of a steam feed recited in amended claim 18.

Moreover, Iwahara does not disclose contacting a steam feed stream with a proton conducting membrane through the porous substrate on which the membrane is supported, as recited in amended claim 18. Instead, Iwahara discloses that a steam feed is supplied through an opening in an end of the ceramic tube housing (Fig. 12) and supplied directly to the electrode/electrolyte without first passing through a porous substrate upon which the electrolyte is supported. Therefore, Iwahara does not disclose the contacting recited in amended claim 18. Moreover, Iwahara does not disclose preparing the membrane using a sintering aid, let alone a Zn doped oxide sintering aid, as recited in amended claim 18. Therefore, Iwahara does not

anticipate amended claim 18, and amended claim 18, as well as claim 19 depending therefrom, should be patentable over the cited art.

Claim 20 has been amended in a manner similar to amended claim 18. Therefore, for reasons similar to those explained with respect to claim 18, amended claim 20, as well as claims 21, 23 and 24 depending therefrom, should be patentable over the cited art.

For the reasons described above, claims 18-21, 23 and 24 should be patentable over the cited art. Accordingly, withdrawal of this rejection is respectfully requested.

IV. Rejection of Claims 22, 24-28 and 32-35 Under 35 U.S.C. §103(a)

Claims 22, 24-28 and 32-35 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Iwahara in combination with Valkenbert, et al., Solid State Ionics 97 (1997) 511-515 ("Valkenbert"), EP Patent No. EP 0 472 922 A to Fraunhofer-Gesellschaft Zur Foerderung Der Angewandten Forschung E.V. ("Fraunhofer"), Schneller (Solid State Ionics Vol 164 (2003), pages 131-136 and U.S. Publication No. 2002/0081762 to Jacobson, et al. ("Jacobson"). Claims 22, 24-28 and 32-35 depend from claims 18 and 20 and should be patentable for at least the same reasons as claims 18 and 20, and for the specific elements recited therein. Moreover, the addition of Valkenbert, Fraunhofer, Schneller and Jacobson does not make up for the deficiencies of Iwahara discussed with respect to claims 18 and 20, from which claims 22, 24-28 and 32-35 depend. Accordingly, Iwahara taken in view of Valkenbert, in view of Fraunhofer and in further view of Schneller does not make claims 22, 24-28 and 32-35. Therefore, claims 22, 24-28 and 32-35 should be patentable over the cited art, and withdrawal of this rejection is respectfully requested.

III. Claims 30 and 31

Claims 30 and 31 have been objected to as being dependent from a rejected base claim, been have indicated to be allowable if rewritten in independent form. Thus, claims 30 and 31 have been rewritten in independent form. Accordingly, an indication of allowance of claims 30 and 31 is respectfully requested.

IV. New Claims 36-51

New claims 36-49 depend from claim 18 and should be patentable for at least the same reasons as claim 18, and for the specific elements recited therein. New claims 36 and 43 are supported by at least page 6, lines 24-25 of the Specification. New claims 37 and 44 are supported by at least claim 30 as originally filed. New claims 38 and 45 are supported by at least page 7, line 22 of the Specification and claim 30 as originally filed. New claims 39, 40, 46 and 47 are supported by at least page 7, lines 24-27 of the Specification. New claims 41 and 48 are supported by at least page 7, lines 3-11 of the Specification. New claims 42 and 49 are similar to claim 31 as originally filed. None of the cited art discloses or suggests the subject matter recited in new claims 36-49. Therefore, none of the cited art anticipates new claims 36-49 or makes new claims 36-49 obvious to one of ordinary skill in the art.

New claims 50 and 51 depend from claim 20 and are patentable over the cited art for at least the same reasons as claim 20, and for the specific elements recited therein. New claim 50 is supported by at least page 13, lines 14-16 of the Specification. New claim 51 is supported by at least page 4, line 1 and page 11, line 6 of the Specification, which discloses the employment of $\text{Ba}_3\text{Ca}_{1.18}\text{Nb}_{1.82}\text{O}_{8.73}$, wherein it is known in the art of crystal chemistry that Tantalum and Niobium are typically interchangeable as they are very similar in size and charge. Furthermore, page 3, line 31 and page 5, line 16 of the Specification gives general examples of Tantalum containing analogues being used and a skilled person would appreciate from this that Tantalum analogues of $\text{Ba}_3\text{Ca}_{1.18}\text{Nb}_{1.82}\text{O}_{8.73}$ are also contemplated. None of the cited art discloses or suggests the subject matter of new claims 50 and 51. Accordingly, none of the cited art anticipates new claims 50 and 51 or makes new claims 50 and 51 obvious to one of ordinary skill in the art.

In view of the foregoing, new claims 36-51 should be patentable over the cited art. Accordingly, consideration and allowance of new claims 36-51 is respectfully requested.

CONCLUSION

In view of the foregoing remarks, Applicant respectfully submits that the present application is in condition for allowance. Applicant respectfully requests reconsideration of this application and that the application be passed to issue.

Please charge any deficiency or credit any overpayment in the fees for this amendment to our Deposit Account No. 20-0090.

Respectfully submitted,

Date 8/23/05


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